

DYNAMIC & ENERGETIC CONSTRAINTS ON THE TROPICAL RAIN BELT

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GUEST LECTURE

The atmospheric Hadley circulation, characterized by ascent in the deep tropics and descent in the subtropics, is complemented by the zonal-mean wind-driven shallow oceanic subtropical cells, with upwelling near the equator and downwelling at higher latitudes. The coupled momentum and energy budgets of the oceanic and atmospheric tropical overturning circulations determine the emergent properties of these circulations, such as the tropical rain belt.

The shared role of the atmosphere and oceans in setting the properties of the tropical rain belt has long been recognized. Yet, only recently, by applying simplifying assumptions on the dynamic and energetic links between the atmosphere and oceans, do we see the emergence of a promising theoretical framework that provides constraints on the position and intensity of the tropical rain belt. In this seminar, I will describe this emerging theoretical framework, contributions by my research group, and applications.



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I am a senior lecturer at the Fredy and Nadine Herrmann Institute of Earth Sciences at the Hebrew University since 2016. I have a B.Sc. in Astrophysics and a Ph.D. in Atmospheric Dynamics, both from the Hebrew University. Prior to my appointment at the Hebrew University, I co-founded a medical device company (www.pulm-one.com) and headed its research and development.

I am the head of the academic committee of the recently established (2019) Hebrew University Climate Science Center (HUCS). The center is dedicated to advancing climate modeling through fundamental science, and aims to develop a unique climate model that specializes in the Middle East region. I also head the Hebrew University Research Computing Services.

In my research group, we study the large-scale dynamics of the atmosphere and oceans and the interactions between them, with an emphasis on tropical dynamics. I am particularly interested in the mechanisms controlling the tropical rain belt, cloud-atmosphere-ocean coupling, and the dynamics of Earth's climate across a wide range of timescales (from the recent global warming to climatic changes on geological timescales).